IEEE 802.1AX
YANG modeling completion

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Agenda

Topics

- Intro
- Purpose
- Current 2016 802.1AX draft YANG model
    - Terminology in brief
    - What's working already
    - Gaps
    - Example XML using the current draft
- Proposal for completing the model

Introduction & Purpose

Who am I?

Jeff Hartley

- CommScope Distinguished Engineer
- Broadband Forum YANG editor/contributor
- IETF YANG contributor/document shepherd
- Linux Foundation Networking contributor
- "One of those SDN-NfV guys" for the last decade
- 30+ years of "networking stuff" (Tier-1, MSO, financial)

Why am I here?

- Don Quixote-like quest to "standardize all the things" via standard data models
- Fill gaps in currently-available standard data models for the most common things first
- Final released versions of models are always better than Draft versions (fewer breaking changes)

Currently-available draft ieee802-dot1ax.yang

Terminology in brief -- as the 802.1AX Standard relates to the draft YANG:

- **Aggregation System**
  - A set of Link Aggregation Groups, but typically, "the whole device" in practice
  - Top-level YANG config section, separate from interfaces
- **Aggregator**
  - Responsible for a LAG
  - Can be thought of functionally 1:1 equivalent, i.e, "a LAG in the YANG config"
  - Configured as a logical Ethernet-like IETF interface
- **Aggregation Port**
  - The individual IETF interfaces (atop hardware) that are part of a LAG (aka "LAG members").
- **Static vs Dynamic LAGs**
  - LACP protocol sits atop a static LAG to dynamically form/reform which ports are members
  - Surprisingly little configuration is required
- **DRNI**
  - Best thought of as "the standard alternative to the 32+ vendor-proprietary multi-chassis LAG protocols out there"

Currently-available draft ieee802-dot1ax.yang

What's already working:

- Meshing with upstream and downstream YANG (IETF, BBF)
- Single-system ("box") LAGs
- Simple LACP configs w/automatic configuration

Gaps:

- Load-Sharing Distribution algorithms
  - ex: L2+L3 hashing selection on a LAG-by-LAG basis
  - ref. Section 8, "Distribution algorithms"
- More tune-able settings, timers, priorities (various)
- DRNI
  - ref. Section 9, "Distributed Resilient Network Interconnect"
- More counters, state/operational data, notifications
  - ref. Section 7, "Management"
- NMDA and NACM refinement of the YANG
- Descriptions and references

Currently-available draft ieee802-dot1ax.yang (example, page 1 of 2)

```
<!-- NOTE: This assumes the 2 ietf-hardware ports have been detected and populated in
YANG upon bootstrapping. -->
<config>
  <interfaces xmlns="urn:ietf:params:xml:ns:yang:ietf-interfaces">
    <interface>
      <name>NNI-1/1/1</name>
      <description>LAG_PORT_1_OF_2</description>
      <type>ethernetCsmacd</type>
      <enabled>true</enabled>
      <hardware-component xmlns="urn:bbf:yang:bbf-hardware">
        <port-layer-if>NNI-1/1/1</port-layer-if>
      </hardware-component>
      <interface-usage xmlns="urn:bbf:yang:bbf-interface-usage">
        <interface-usage>network-port</interface-usage>
      </interface-usage>
      <aggregation-port xmlns="urn:ieee:std:802.1AX:yang:ieee802-dot1ax">
        <aggregation-port-lacp>
          <actor-system-priority>1</actor-system-priority>
          <actor-admin-key>1001</actor-admin-key>
          <actor-port-priority>1</actor-port-priority>
          <actor-admin-state>lacp-activity lacp-timeout aggregation
                             synchronization collecting distributing
          </actor-admin-state>
          <!-- If lacp-activity is flagged here (true) then ACTIVE mode is enabled.
               Don't set it for PASSIVE. -->
          <!-- lacp-timeout correct intepretation is
               short-lacp-timeout = 1,
               long = 0. -->
          <!-- aggregation means "aggregateable" -->
          <!-- synchronization, collecting, and distributing are actually more
               relevant to operational data, meaning "in the right LAG ID, and is
               sending & receiving okay." Admin config these to true. -->
          <!-- Never admin set expired (8th bit, pos 7). -->
        </aggregation-port-lacp>
      </aggregation-port>
    </interface>
```

```
<interface>
  <name>NNI-1/2/1</name>
  <description>LAG_PORT_2_OF_2</description>
  <type>ethernetCsmacd</type>
  <enabled>true</enabled>
  <hardware-component xmlns="urn:bbf:yang:bbf-hardware">
    <port-layer-if>NNI-1/2/1</port-layer-if>
  </hardware-component>
  <interface-usage xmlns="urn:bbf:yang:bbf-interface-usage">
    <interface-usage>network-port</interface-usage>
  </interface-usage>
  <aggregation-port xmlns="urn:ieee:std:802.1AX:yang:ieee802-dot1ax">
    <aggregation-port-lacp>
      <actor-system-priority>1</actor-system-priority>
      <actor-admin-key>1001</actor-admin-key>
      <actor-port-priority>1</actor-port-priority>
      <actor-admin-state>lacp-activity lacp-timeout aggregation synchronization
                         collecting distributing</actor-admin-state>
    </aggregation-port-lacp>
  </aggregation-port>
</interface>
```

Currently-available draft ieee802-dot1ax.yang (example, page 2 of 2)

```
    <interface>
      <name>LAG-1</name>
      <description>NNI_LAG</description>
      <type>ieee8023adLag</type>
      <enabled>true</enabled>
      <interface-usage xmlns="urn:bbf:yang:bbf-interface-usage">
        <interface-usage>network-port</interface-usage>
      </interface-usage>
      <aggregator xmlns="urn:ieee:std:802.1AX:yang:ieee802-dot1ax">
        <name>LAG-1</name>
        <agg-system-name>LACP-LAG-SYSTEM</agg-system-name>
        <admin-state>up</admin-state>
        <link-up-down-notification>enabled</link-up-down-notification>
          <!-- collector-max-delay
          "Defines the maximum delay, in tens of microseconds,
          that may be imposed by the Frame Collector between
          receiving a frame from an Aggregator Parser, and
          either delivering the frame to its MAC Client or
          discarding the frame (see 5.2.3.1.1).";
          "IEEE 802.1AX-2008, Clause 6.3.1.1.32";
          -->
        <collector-max-delay>10</collector-max-delay>
        <aggregator-lacp>
          <actor-admin-key>1001</actor-admin-key>
        </aggregator-lacp>
      </aggregator>
    </interface>
  </interfaces>

  <lag-system xmlns="urn:ieee:std:802.1AX:yang:ieee802-dot1ax">
    <aggregating-system>
      <agg-system>LACP-LAG-SYSTEM</agg-system>
      <system-id>AB-CD-12-34-56-70</system-id>
        <!-- System Identifier is the concatenation of the System
          Priority and the System MAC address. -->
      <system-priority>1</system-priority>
    </aggregating-system>
  </lag-system>
</config>
```

Proposal

Hartley is volunteering for YANG duty:

- I'll volunteer to pick up editing duties for the draft YANG, applying Best Common Practices (similar to BBF's OD-360).
- I'll help to discuss/comment/debate/resolve proposed changes/edits via remote working sessions/calls & e-mail.
- Scott & others will handle the Adobe tooling and procedural aspects.